

**REMARKS**

Applicant has carefully reviewed and considered the Office Action mailed on September 10, 2003, and the references cited therewith.

Claims 23, 29, 31 and 32 are amended, no claims are canceled, and no claims are added; as a result, claims 3-32 remain pending in this application.

**§112 Rejection of the Claims**

Claims 23-26 and 29 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant has amended claims 23 and 29 to overcome this rejection. In particular, Applicant has amended claim 23 to recite a “method,” while amending claim 29 to depend from independent claim 27.

**§103 Rejection of the Claims**

Claims 3, 5, 6, 8-10 and 30-32 were rejected under 35 USC § 103(a) as being unpatentable over Connors et al. (Proceedings of the 32nd Annual International Symposium on Microarchitecture (MICRO), Nov. 1999; hereinafter referred to as Connors) in view of Roediger et al. (U.S. 5,960,198; hereinafter referred to as Roediger) and in further view of Muller et al. (U.S. 6,389,468; hereinafter referred to as Muller). Applicant respectfully traverses this rejection because the Office Action relied on a non-analogous art reference.

“In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned.’ *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). See also *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986); *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992).” MPEP §2141.01(a). In determining whether a reference is analogous, “the similarities and differences in structure and function of the inventions carry far greater weight” than reference classifications and the cross-references in the official search notes. MPEP §2141.01(a) quoting *In re Ellis*, 476 F.2d 1370, 1372, 177 USPQ 526, 527 (CCPA 1973).

Thus, there is a two-part analysis for determining whether a reference is nonanalogous art. In the first part, a determination is made about whether the reference is in the Applicant's field of endeavor. If the reference is not in the Applicant's field of endeavor, the analysis proceeds to a second part, which asks whether the reference is particularly pertinent to the problem with which the inventor was concerned. Additionally, the MPEP points out that similarities and differences in structure and function between the claimed invention and the reference are evidence of whether a reference is nonanalogous art. The following discussion will first address the two-part analysis vis-à-vis the rejected claims and Muller. After addressing the two-part analysis, differences in structure and function between the claimed invention and Muller will be discussed.

Now the first part of the nonanalogous art analysis will be discussed. The Federal Circuit's decision in *Wang Laboratories, Inc. v. Toshiba Corp.* provides insight into determining whether a reference is in a claimed invention's field of endeavor. In *Wang Laboratories, Inc. v. Toshiba Corp.*, the Federal Circuit ruled that a reference was not in the same *field of endeavor* merely because the reference and the claimed invention related to computer memories. *Wang Laboratories, Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ 2d 1767 (Fed. Cir. 1993). In *Wang*, the Federal Circuit stated:

The Allen-Bradley art is not in the same field of endeavor as the claimed subject matter merely because it relates to memories. It involves memory circuits in which modules of varying sizes may be added or replaced; in contrast the subject patents teach compact modular memories. *Id.*, 26 USPQ 2d at 1773.

Therefore, because the reference and the claimed invention related to different aspects of computer memory, the Federal Circuit ruled that they are not in the same field of endeavor.

Regarding Applicant's field of endeavor, Applicant states, "The present invention relates generally to software, and more specifically to software capable of reusing regions of code." Patent Application at page 1. Software that reuses a program's code regions stores execution results for some of the program's code regions. If those code regions are encountered later in the program execution, the software can reuse the stored execution results instead of re-executing the code region. Embodiments of the claimed invention describe methods for identifying reuse regions and determining various reuse region information (e.g., determining information about

set-values for a set of input registers, determining an occurrence frequency of input registers, etc.).

In contrast Muller's field of endeavor "relates to a Network Interface Circuit (NIC) for processing communication packets exchanged between a computer network and a host computer system." Muller column 1, lines 49-52. In particular, Muller describes a system and method for "distributing or sharing the processing of network traffic (e.g., through a protocol stack on a host system) received at a multiprocessor computer system." Muller Abstract lines 1-4.

Applicant's field of endeavor is clearly separate from Muller's field of endeavor. While Applicant's field of endeavor relates to code reuse and identifying reuse regions of program code, Muller relates to processing communication packets exchanged between two computers. As noted above, in *Wang*, the seemingly similar fields of endeavor were ruled to be different. In the present case, Applicant's field of endeavor is extremely different from that of the reference. Therefore, Applicant respectfully submits that the claimed invention and Muller are in different fields of endeavor. The analysis will now continue with the second part.

Because Applicant's claimed invention and Muller related to different fields of endeavor, the second part of the nonanalogous art analysis will be discussed. In particular, the following discussion will show that Muller is not particularly pertinent to the problem with which Applicant was concerned. Applicant's claimed invention is concerned with solving problems related to identifying reuse regions. The Applicant sets out methods for determining information about candidate reuse regions and determining whether candidate reuse regions should be included in computational reuse regions. *See* Application page 15, lines 19-29. In contrast, Muller is trying to solve problems related to distributing network traffic processing on a multiprocessor computer. Because Muller relates to processing network traffic, it is not particularly pertinent to Applicant's claimed invention. Therefore, Applicant respectfully submits that Muller is not particularly pertinent to the problem with which Applicant is concerned.

As noted above, the structure and function of the inventions are evidence of whether a reference is analogous art. *See* §2141.01(a). The structure of Muller's invention is shown in Figure 1A. Figure 1A describes a network interface circuit (NIC) used in accordance with an embodiment of the invention. *See* Muller at column 8, lines 9-10. Figure 1A illustrates various

network interface components such as a DMA engine 120, dynamic packet batching module 122, control queue 118, packet queue 116, checksum generator 114, input port processing module 104, header parser 106, load distributor 112, flow database manager 108, and flow database 110. As for Muller's function, many its figures describe operations performed by these components of the NIC. *See Muller* at column 4, line 58 to column 5, line 56. For example, Figures 6A-6E describe a method for managing a NIC flow database. As another example, Figures 13-20 are flow charts describing methods for transferring a packet from a network buffer to a host memory. *See Muller* at column 5, lines 35-38. As yet another example, Figures 25A-25B describe operations for discarding a packet from a network interface.

In contrast to Muller, the claimed invention recites structures such as candidate reuse regions and input registers. The claimed invention's function is performing operations on the structures. For example, claim 3 recites "identifying a candidate reuse region," "determining an input set for the candidate reuse region," and "combining each of the input register values into a single value."

Notably, the structures of Muller and the claimed invention are starkly different. For example, Muller's structure includes components of a NIC, while Applicant's structure includes reuse regions and registers. The functions are also starkly different. Muller's functionality relates to operations performed by a NIC, while Applicant's claims recite operations for identifying and profiling reuse regions. Therefore, Applicant submits that the difference in structure and functionality supports a finding that Muller is nonanalogous art.

Based on the discussion above, Applicant respectfully submits that the two-part nonanalogous art analysis shows that Muller is nonanalogous art. Additionally, the differences in structure and function between Muller and the claimed invention support a finding that Muller is nonanalogous art. Because Muller is nonanalogous art, the Office Action has improperly relied on Muller and has not established a *prima facie* case of obviousness, as required by MPEP §2142. As such, Applicant respectfully requests that the rejections under 35 USC § 103(a) over the cited combination be withdrawn. Additionally, Applicant submits that 3, 5, 6, 8-10 and 30-32 are in condition for allowance.

Claim 4 was rejected under 35 USC § 103(a) as being unpatentable over Connors et al. in view of Roediger et al., in further view of Muller et al., and further in view of Dictionary of Computing (Oxford University Press, 1996). Because Muller is nonanalogous art (see discussion above), the Office Action has improperly relied on Muller and has not established a *prima facie* case of obviousness, as required by MPEP §2142. As such, Applicant respectfully requests that the rejections under 35 USC § 103(a) over the cited combination be withdrawn.

Claim 7 was also rejected under 35 USC § 103(a) as being unpatentable over Connors et al. in view of Roediger et al., in further view of Muller et al., and further in view of Calder et al. (Journal of Instruction-Level Parallelism, 1999) and Buzbee (U.S. 5,909,578). Because Muller is nonanalogous art (see discussion above), the Office Action has improperly relied on Muller and has not established a *prima facie* case of obviousness, as required by MPEP §2142. As such, Applicant respectfully requests that the rejections under 35 USC § 103(a) over the cited combination be withdrawn.

Claims 11, 12, 14 and 15 were also rejected under 35 USC § 103(a) as being unpatentable over Connors et al. in view of Dictionary of Computing, in view of Roediger et al., and in further view of Muller et al. Because Muller is nonanalogous art (see discussion above), the Office Action has improperly relied on Muller and has not established a *prima facie* case of obviousness, as required by MPEP §2142. As such, Applicant respectfully requests that the rejections under 35 USC § 103(a) over the cited combination be withdrawn.

Claim 13 was also rejected under 35 USC § 103(a) as being unpatentable over Connors et al., in view of Dictionary of Computing, in view of Roediger et al., in further view of Muller et al., and in further view of Chang (U.S. 5,933,628). Because Muller is nonanalogous art (see discussion above), the combination does not teach or suggest all the elements of each rejected claim, as required by MPEP §2142. As such, Applicant respectfully requests that the rejections under 35 USC § 103(a) over the cited combination be withdrawn.

Claims 16, 17, 20-22 and 29 were rejected under 35 USC § 103(a) as being unpatentable over Connors et al. in view of Roediger et al., and in further view of Calder et al., and in further

view of Dictionary of Computing. Applicant respectfully traverses this rejection because the combination does not teach all the elements of each rejected claims, as required by MPEP §2142.

The combination does not teach or suggest each and every element of claims 16 and 20 because it does not teach or suggest “instrumenting the software to sample a location-value every S occurrences of the candidate load instruction.” In rejecting independent claims 16 and 20, the Office Action admits that Connors does not teach “instrumenting the software to sample a location-value every S occurrences of the candidate load instruction.” However, the Office Action states, “It would have been obvious to one of ordinary skill in the art at the time of the invention to implement Connors’ system of region reuse dependent on memory instructions with sampling on a regular basis as found in Computing’s teachings.”

The Dictionary of Computing (hereinafter referred to as “Dictionary”), provides the following definitions of sampling: 1) “A process by which the value of an analog, or continuous, signal is ‘examined’ at discrete fixed intervals of time.” 2) “The act of selecting items for study in such a way that the measurements made on the items in the sample will provide information about similar items not in the sample.” Although these definitions discuss general concepts of sampling, they do not teach “instrumenting the software to sample a location-value every S occurrences of the candidate load instruction.” Thus, the only way for the combination to teach every element of claim 16 is for Roediger and/or Calder to teach what the Dictionary and Connors are lacking. The Office Action does not point to a passage in Roediger or Calder that teaches or suggests the claim limitation cited above. Therefore, Applicant respectfully submits that the Office Action did not make a *prima facie* case of obviousness because the cited combination does not teach every element of claim 16.

Additionally, the Office Action has improperly combined the Dictionary of Computing with the other cited references. The Office Action does not cite a passage from any reference of the combination that teaches or suggests combining the teachings of the references. For example, the Dictionary does not indicate that sampling is desirable for “instrumenting the software to sample a location-value every S occurrences of the candidate load instruction.” If fact, if the Dictionary’s definitions for sampling are combined with the teachings of Connors, Calder, and Roediger, it is unclear what would be sampled. Because there is no teaching or suggestion about how sampling would be used, Applicant respectfully submits that the Office

Action relied on the Applicant's disclosure and/or impermissible hindsight in forming the rejection of claim 16 under 35 USC §103 over the cited references.

Claims 17, 20, and 22 depend, directly or indirectly, on claims 16 and 21, respectively, and are patentable over the cited combination for the reasons argued above, plus the elements in the claims. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *See* MPEP § 2143.03.

Claim 29 depends from claim 27 and therefore includes all the limitations of claim 27. In the discussion of claims 16, 17, 20-22 and 29, the Office Action did not discuss dependent claim 29. Although Applicant respectfully submits that the cited combination does not teach all the elements of claim 29, Applicant also requests clarification about the grounds on which claim 29 is rejected.

Claims 18 and 19 were also rejected under 35 USC § 103(a) as being unpatentable over Connors et al. in view of Roediger et al., in further view of Dictionary of Computing in view of Calder et al., and in further view of Chang. Claims 18 and 19 depend from claim 16 and therefore include all the limitations of claim 16. Thus claims 18 and 19 include a limitation for “instrumenting the software to sample a location-value every S occurrences of the candidate load instruction.” As discussed above, the combination of Dictionary, Connors, Calder, and Roediger do not teach or suggest all the limitations of claim 16. The only way for the combination of Connors, Roediger, Dictionary, Calder, and Chang to teach or suggest all the elements of claims 18 and 19 is for Chang to teach what the others are lacking. The Office Action does not cite a passage in Chang that teaches “instrumenting the software to sample a location-value every S occurrences of the candidate load instruction.” Moreover, Applicant is not aware of any such passage in Chang. Therefore, Applicant respectfully submits that the cited combination does not teach all the elements of claims 18 and 19.

Claims 23 and 27 were also rejected under 35 USC § 103(a) as being unpatentable over Connors et al. in view of Calder et al. Applicant respectfully traverses this rejection because the combination does not teach all the elements of claims 23 and 27. Claims 23 and 27 include a limitation for “selecting a reuse region as a function of the probability of top set-values.” In rejecting claims 23 and 27, the Office Action states, “Connors discloses limitations concerning

profiling set-values for selecting a candidate reuse region to be used based on probability” The Office Action at page 18. The Office Action points to Connors at pages 158-159 as teaching the limitation quoted above. Applicant respectfully submits that the Office Action has mischaracterized Connors. Although Connors does include a short section on value profiling, Connors does not teach or suggest “selecting a reuse region as a function of the probability of top set-values.” As such, Applicant respectfully submits that the cited combination does not teach every element of the rejected claims.

Claims 24-26 and 28 were also rejected under 35 USC § 103(a) as being unpatentable over Connors et al. in view of Calder et al., and in further view of Muller et al. As discussed above, Applicant respectfully submits that Muller is nonanalogous art. Because the Office Action relied on a nonanalogous reference, Applicant respectfully requests that the rejection of claim 4 be withdrawn.

Reservation of Rights

Applicant does not admit that references cited under 35 U.S.C. §§ 102(a), 102(e), 103/102(a), or 103/102(e) are prior art, and reserves the right to swear behind them at a later date. Arguments presented to distinguish such references should not be construed as admissions that the references are prior art.



AMENDMENT UNDER 37 C.F.R. 1.116 – EXPEDITED PROCEDURE

Serial Number: 09/522510

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Title: SOFTWARE SET-VALUE PROFILING AND CODE REUSE

Assignee: Intel Corporation

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Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney 612-371-2169 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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